



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/570,665

03/06/2006

Akihiko Endo

P29120

1241

7055 7590 09/10/2008  
GREENBLUM & BERNSTEIN, P.L.C.  
1950 ROLAND CLARKE PLACE  
RESTON, VA 20191

EXAMINER

CAMPBELL, SHAUN M

ART UNIT

PAPER NUMBER

2829

NOTIFICATION DATE

DELIVERY MODE

09/10/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com  
pto@gbpatent.com

|                              |                                      |                                    |  |
|------------------------------|--------------------------------------|------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/570,665 | <b>Applicant(s)</b><br>ENDO ET AL. |  |
|                              | <b>Examiner</b><br>SHAUN CAMPBELL    | <b>Art Unit</b><br>2829            |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,6,14 and 15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,6,14 and 15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**FINAL ACTION**

1. Amendment A, received 7/8/2008, has been entered into the record.
2. Claims 1, 6, 14, and 15 are presented for examination. Claims 1 and 6 are amended; claims 14 and 15 are new; and claims 2-5 and 7-13 are canceled.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazato et al. (US Patent No. 5,071,785) hereafter referred to as Nakazato, in view of Masaki et al. (Patent Pub. of Japan No. 09-008124, translation supplied as prior art in the IDS filed 6/13/2006) hereafter referred to as Masaki.

5. As to claim 1, Nakazato discloses a manufacturing method of a bonded wafer (title), in which said bonded wafer (fig 1c, bonded wafers 1b and 1a) is manufactured by bonding a wafer for active layer wafer (fig 1, 1b) with a supporting wafer (fig 1, 1a), wherein

said active layer wafer (fig. 1, 1b) and said supporting wafer (fig 1, 1a), which are to be bonded together, have fitting surfaces, respectively, for fitting to each other, each of said fitting surfaces comprising a part of a spherical surface having the same curvature (fig 1, bonded wafers 1a and 1b);

at least either one of said active layer wafer or said supporting wafer are covered with film layers (fig. 1, oxide film 1c) of the same material on the top and the back surfaces thereof, and wherein the film materials of said active layer wafer and said supporting wafer are different from the materials of said active layer wafer and said supporting wafer.

However, Nakazato does not explicitly disclose the film thickness on the top surface side is differentiated from the film thickness on the back surface side of said active layer wafer and said supporting wafer, thereby generating a warp in said active layer wafer and said supporting wafer and bonding said fitting surfaces together.

Nonetheless, Masaki discloses using a difference between the film thickness of a buried oxide film and that of an oxide film on the reverse surface being manufactured by the oxide films (translated abstract/constitution).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the difference in the oxide film thicknesses in order to control the amount of warpage as disclosed by Masaki in order to create and control the warpage of the wafers of Nakazato because controlling the thicknesses of the oxide film on the top and back sides of the wafers is a precise way to control the amount of warpage of the wafers.

6. As to claim 14, Nakazato in view of Masaki discloses the manufacturing method of a bonded wafer according to claim 1 (paragraphs above).

Nakazato further discloses wherein said supporting wafer is provided as a silicon wafer (abstract) comprising silicon oxide films (fig 1, oxide film 1c) on the top and the back surfaces thereof, and wherein one of the silicon oxide films, either on the top surface side or on the back surface side, is thinned down by etching (abstract).

However, Nakazato in view of Masaki does not explicitly disclose that the wafer is thinned with hydrogen fluoride. Nonetheless, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use hydrogen fluoride because hydrogen fluoride is commonly used as an etchant.

7. Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazato in view of Masaki as applied to claims 1 and 14 above, and further in view of Moriceau et al. (US Patent No. 6,756,285 B1) hereafter referred to as Moriceau.

8. As to claims 6 and 15, Nakazato in view of Masaki discloses the manufacturing method of a bonded wafer according to claims 1 and 14 (paragraphs above).

Nakazato in view of Masaki does not explicitly disclose:

ion-implanting hydrogen gas or noble gas into said active layer wafer to form an ion-implanted layer in said active layer wafer;

subsequently bonding said active layer wafer with said supporting wafer to form said bonded wafer; and

heat treating said bonded wafer by holding it at a predetermined temperature to induce a cleavage and separation at the site of ion-implanted layer as an interface.

Nonetheless, Moriceau discloses ion-implanting hydrogen gas or noble gas into said active layer wafer to form an ion-implanted layer in said active layer wafer (fig 7, 112; and col. 9, lines 42-49);

subsequently bonding said active layer wafer with said supporting wafer to form said bonded wafer (col. 10, lines 16-19); and

heat treating said bonded wafer by holding it at a predetermined temperature to induce a cleavage and separation at the site of ion-implanted layer as an interface (col. 10, lines 23-34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of ion-implanting into the active layer wafer as disclosed by Moriceau and evidenced by the background section of the application with the teachings of Nakazato in view of Masaki because this will allow the wafer to fracture at determined locations.

### ***Response to Arguments***

9. Arguments filed 7/8/2008 are moot in view of new grounds of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **SHAUN CAMPBELL** whose telephone number is (571)270-3830. The examiner can normally be reached on Monday Through Friday 8:00AM-5:30PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nguyen Ha can be reached on (571) 272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2829

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Shaun Campbell/  
Examiner, Art Unit 2829  
9/3/2008

/Ha T. Nguyen/  
Supervisory Patent Examiner, Art Unit 2829